REMARKS

Reconsideration and allowance of this application are respectfully requested.

By this Amendment, claims 59-65 have been canceled without prejudice or disclaimer of their subject matter, and claims 1-18, 20, 22-40, 42, and 45-58 have been amended.

Claim 1 has been amended to clarify that the method operates "in a system comprising a network having one or more parent server sites and one or more edge server sites distinct from said parent server sites." Support for this amendment is found in the application as filed, *e.g.*, in ¶0020 and Fig. 1. The other independent claims have been similarly amended.

The claims have also been amended to refer to server *sites* instead of just servers. Again, this is supported in the application as filed, *e.g.*, in ¶0020 ("A parent server site (or simply parent site or parent server) may comprise one parent server or a cluster of parent servers. Likewise, an edge server site (or simply edge site or edge server) may comprise one edge server or a cluster of edge servers ...")

Claim 1 has been further amended to recite the step of "conditionally replicating the requested object to the particular edge server site, said replicating being based at least in part on a dynamic measure of popularity of the requested object." Support for this amendment is found throughout the application as filed, including, *e.g.*, at ¶¶0016-18, 21, 26-27.

Claim 1 has also been amended to clarify that the conditional replication of content on an edge server is independent of whether or not that edge server actually serves the content. In other words, even if the edge server site does not have the requested content and even if the requested content is served to the requesting client from another server site in the network, the content *may* still be replicated on the *edge server site*. The "replicating being based at least in part on

a dynamic measure of popularity of the requested object." Claim 23 has been similarly amended.

Claim 16 has been amended to specifically recite that the replication on the edge server occurs conditionally "if the edge server site does not have the requested object" and "based at least in part on a dynamic measure of popularity of the requested object." Claim 38 has been similarly amended.

No new matter has been added by these amendments.

Claims 1-58 are pending in this application.

A. REQUEST FOR PERSONAL INTERVIEW

The undersigned thanks the Examiner for returning the undersigned's telephone calls about this application. Applicant respectfully submits that this application is in condition for allowance. The undersigned respectfully requests a personal interview with the Examiner regarding this application to resolve any outstanding issues in this case.

B. CLAIM REJECTIONS UNDER 35 U.S.C. §101

The Examiner rejected claims 23 and 38 under 35 U.S.C. §101 as being directed to computer program code. The Examiner also rejected dependent claims 24-37 and 39-44 under 35 U.S.C. §101 by virtue of their dependence on claims 23 and 38.

The claims have been amended, as suggested by the Examiner, to software that is embodied on computer-readable storage media. Specifically, claims 23 and 38 have been amended to recite: "computer program product comprising computer-readable media including computer program code having instructions to cause a processor to perform a method for managed object replication and delivery, the method comprising ..." Applicant respectfully submits that these claims are directed to statutory subject matter under §101.

In view of the above, withdrawal of this rejection under §101 is respectfully requested.

C. THE PRIOR ART REJECTIONS

The Examiner rejected claims 1-65 under 35 U.S.C. §103(a) as being unpatentable over Jungck (U.S. Pub. No. 2005/0021863 – hereinafter "**Jungck**") and Sim (U.S. Pub. No. 2003/0031176 – hereinafter "**Sim**").

In **Jungck**, client requests are handled by cache servers 208 (as described in ¶0057, relied upon by the Examiner). These cache servers intercept client requests and attempt to service them. *Id.* When a cache server does not have the requested content (a so-called "miss"), the cache forward the request on to the content source which forwards the content to the client through the cache server (possibly acting as a proxy server). *Id.* "[T]he cache server 208 [then] saves a copy of the content in its cache for later requests." *Id.*

Thus, as taught by Jungck, *all* requested content is *unconditionally* cached which, as noted in the application, has serious disadvantages.

In Jungck, the content being cached may be both large and infrequently requested. Caching such objects (large and/or infrequently requested) is very inefficient. Consider the following **example** of the operation of Jungck:

A first client computer requests a very popular large file (*e.g.*, a first movie). Jungck's system caches that file on a cache server.

Now a second client computer requests (through the same cache server) a different very large file (*e.g.*, a second movie) that has never before been accessed and may never again be accessed. In Jungck's scheme, the second file will be unconditionally copied to the cache server, potentially knocking out the first movie. When another request is made for the first movie, it will not be on the cache server and will have to be obtained from the content source. [*End of Example*]

So, and as acknowledged by the Examiner, in Jungck all requested content is *unconditionally* cached. The Examiner states that "Jungck did not *explicitly* disclose if the requested object is popular, replicate the requested object to the edge server from the parent server." *Office Action of* 04/29/2008, §7, pg. 3. Applicant agrees, noting however, that Jungck did not *implicitly* disclose popularity-based replication either.

The Examiner then applies ***Sim***, supposedly to teach "that if the requested object is popular, replicate the requested object to the edge server ([Sim] paragraphs. 47 & 52)." *Id.*

In Sim, large files (not all content) are replicated at nodes at the edge of the network. *Sim* ¶0047. This replication is made by a content provider in advance of any use of the object, based, *e.g.*, on an initial *static* assessment of the objects popularity. *Id.* Thus, in *Sim*, if a content provider believes that certain objects will be popular, those are *unconditionally* replicated to the edge servers. This is akin to the prior art described in the present application (described, *e.g.*, at ¶0013, which notes that "it is difficult to predict popularity and difficult to manage pre-populating."). Sim then uses popularity again, but *not to decide what to cache*, rather for cache pruning – *i.e.*, to decide what to remove from a cache. *Sim*, ¶0236

Sim provides a so-called Storage Management Agent (SMA) to administer aspects of the storage system. The operation of this SMA is separate and apart from Sim's serving and associated replication process. As Sim explains, one function of the SMA is to try to maintain sufficient free space on the various storage systems.

> The Storage Management Agent ... determine[s] a reasonable storage safety threshold, adjusts the "popularity" index of a file, and identifies the least likely to be used blocks. A storage safety threshold is the minimum amount of free storage each content provider must reserve at all times. Based on storage availability and the DS activities, the Storage Management Agent determines the total amount of data to be *pruned* for each content provider and

> schedules the deletion of the least likely to be used blocks.

Sim ¶0199, emphasis provided.

Sim thus simply uses a "popularity index" as part of a clean-up / management process to try to ***maintain*** sufficient free space on a storage system and so to decide ***what to prune*** in a storage system ("... decides what content to prune ..." *Sim*, Abstract). The "popularity" index mentioned in Sim is not used to decide whether or not to replicate an object that is being served to a user (in Sim, as in Jungck, all replication is unconditional). As Sim states at ¶0052 (with emphasis added):

> ... the portions and amount of a large payload file ***maintained*** at each node depends on the available storage, popularity of the content, distribution criteria by the content provider, etc. Thus, least likely to be used blocks of a large payload file ***may be pruned*** (i.e., deleted from local storage) *to make room for other highly desirable content.*

See also *Sim* at ¶0230 which states:

> The Storage Management Subsystem watches the available shared storage, the content provider's reserved storage, and the usage logs. It initiates the removal of less popular content to make room for more popular and new content when available storage is running low.

Sim does not, as the Examiner would have it, teach or in any way suggest "*if the requested object is popular*, replicate the requested object to the edge server."

Applicant respectfully submits that no proposed combination of Jungck with Sim, inasmuch as such a combination is even possible, would produce the invention of **claim 1**. Such a system would lack at least the <u>*conditional*</u> replication of data, wherein the replication is based, at least in part, on <u>a *dynamic* measure of popularity of the requested object</u>. Recall that in both Jungck and Sim, all

replication is unconditional. Recall too that in Sim, to the extent popularity is used, it is not the popularity of the requested object. Rather, it is the popularity of other cached objects that are used to determine which of them to prune (remove) from the cache.

Claims 2-15 depend from claim 1 and are therefore patentable over Jungck and Sim for at least the reasons given above.

The other claims have been similarly amended, and similar arguments apply to them too.

In view of the above, withdrawal of this rejection under §103 is respectfully requested.

CONCLUSION AND REQUEST FOR PERSONAL INTERVIEW

Applicant respectfully submits that the inventions recited in claims 1-65 are not obvious in view of the cited references and that this application is in condition for allowance. An early action to that effect is earnestly solicited.

The Examiner is kindly requested to contact the undersigned at the number provided to schedule a personal interview to resolve any outstanding issues in this case.

CHARGE STATEMENT: Deposit Account No. 501860, order no. **2711-0040**.
The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/ Order Nos. shown above, for which purpose a duplicate copy of this sheet is attached.
This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal sheet is filed.

CUSTOMER NUMBER 74958	Respectfully submitted, By: /Brian Siritzky/37497 Brian Siritzky, Ph.D., Reg. No. 37497

DAVIDSON BERQUIST JACKSON & GOWDEY LLP
4300 WILSON BLVD., 7TH FLOOR, ARLINGTON, VIRGINIA 22203
MAIN: (703) 894-6400 • FAX: (703) 894-6430